During the last few days of the month snow occurred in portions of the Rocky Mountains States, the Lakes Region, and in the northern Appalachian Mountains; some localities in the last-named district received as much as 12 inches or more. The month closed with generally fair weather throughout the country, except in the Lakes Region and extreme northeastern districts, where occasional light rain or snow prevailed.

For the month as a whole the precipitation was ample to excessive in the northeastern quarter of the country, but was scanty in almost all parts of the Cotton States, and from the Great Plains westward. In practically all of the western Plateau districts and California the month was rainless, which was also the case in portions of the southern Plains and over much of Texas. Along the northern Pacific coast where 6 to 10 inches of rain normally occur in October, only limited areas received as much as 1 inch.

RELATIVE HUMIDITY.

The relative humidity for the month as a whole was above the normal in the northern part of the country, except at points in the Dakotas and generally in the northern Rocky Mountain and Plateau regions, where it was below the average. Elsewhere, the atmosphere was relatively drier than the October average, particularly in the central and southern Plains States, and the central Plateau region, and to the westward, where the averages ranged from 10 to 20 per cent below the normal.

GENERAL SUMMARY.

The weather for October as a whole was unfavorable from an agricultural point of view. The maturing of late crops was checked in central and northeastern districts by low temperature during the first part of the month, and before the close freezing weather occurred nearly to the Gulf and south Atlantic coasts, doing considerable damage to winter truck crops and other vegetation. Dry weather prevented preparations for the seeding of winter grains or delayed the germination of the seed in much of the southwestern and western parts of the country, and cloudy, rainy weather from the Ohio Valley northeastward, interfered with the proper drying of corn in the shock. Conditions were favorable for outdoor work in much of the South and Southwest, but unfavorable in the Northeast. Cotton in some localities was injured by the low temperature and frost; potatoes were damaged to some extent in the northern and central parts of the country and in the Rocky Mountains Region. Pastures and ranges had insufficient moisture in many sections, and feed and water were so scarce on the southwestern ranges that stock was shipped to more favorable localities. The weather was generally favorable for fruits, although some apples were damaged by freezing in the Rocky Mountains Region.

SEVERE LOCAL STORMS.

The following notes of severe local storms during October, 1917, have been extracted from reports by officials of the Weather Bureau:

Missouri.—About 7 p. m., October 28, a tornado occurred at the head of Clear Creek, about 10 miles west of Springfield. It moved northward along a path about one-half mile wide and 18 miles long, demolishing houses, barns, and outbuildings, killing stock and destroying trees. Estimated damage, $20,000.

Average accumulated departures for October, 1917.

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
	°F.	°F.	°F.	In.	In.	In.	0–10		P. ct.	
New England	48.5	−1.8	−13.6	4.83	+1.20	−0.30	5.7	+0.3	81	+3
Middle Atlantic	51.6	−4.1	−10.9	5.00	+1.80	−1.30	4.9	+0.2	75	−1
South Atlantic	60.5	−3.2	+0.1	1.43	−2.60	−8.90	3.2	−0.8	75	−2
Florida Peninsula	76.5	0.0	+2.8	3.28	−3.00	−8.10	5.8	+1.2	78	−1
East Gulf	60.7	−4.6	−1.4	0.99	−1.80	−4.00	2.4	−1.4	69	−4
West Gulf	63.5	−3.1	+0.5	0.88	−1.90	−11.80	2.4	−1.3	62	−10
Ohio Valley and Tennessee	50.4	−6.2	−18.8	3.12	+0.60	+2.50	5.5	+1.1	70	−2
Lower Lakes	45.4	−6.4	−26.8	5.54	+2.60	+2.30	7.6	+1.8	76	+2
Upper Lakes	40.3	−7.3	−32.5	3.60	+0.80	−2.30	7.9	+1.9	79	+1
North Dakota	35.3	−7.0	−20.9	0.82	−0.40	−8.60	6.4	+1.2	74	+2
Upper Mississippi Valley	44.4	−8.4	−28.1	1.95	−0.50	−1.90	6.6	+2.1	70	−3
Missouri Valley	46.0	−6.7	−14.9	0.54	−1.40	−4.60	4.8	+0.7	60	−6
Northern Slope	43.1	−1.3	−18.9	0.56	−0.40	−1.40	5.1	+0.8	64	0
Middle Slope	51.3	−4.3	−9.1	0.40	−1.10	−6.40	3.6	+0.1	53	−8
Southern Slope	61.3	−1.1	+3.9	0.12	−2.00	−7.20	1.9	−1.8	42	−22
Southern Plateau	62.8	+2.9	−5.0	0.05	−0.60	−2.10	1.0	−1.2	41	−3
Middle Plateau	53.2	+2.4	−24.6	T.	−0.80	−2.30	1.6	−1.7	35	−15
Northern Plateau	52.0	+2.6	−12.6	0.03	−1.20	−1.90	5.7	+1.1	60	−1
North Pacific	53.5	+1.8	−7.6	1.00	−2.90	−8.60	5.7	−0.7	60	−23
Middle Pacific	63.0	+4.3	−1.5	0.00	−1.60	−8.00	3.4	−0.4	54	−13
South Pacific	66.5	+4.2	+6.7	0.06	−0.80	−3.30	3.2	+0.1	64	−3

551.506 (201.1)

WEATHER CONDITIONS OVER THE NORTH ATLANTIC OCEAN DURING OCTOBER, 1916.

The data presented are for October, 1916, and comparison and study of the same should be in connection with those appearing in the REVIEW for the month.

Chart IX (XLV—102) shows for October, 1916, the averages of pressure, temperature, and prevailing direction of the wind at 7 a. m. 75th meridian time (Greenwich mean noon). Notes on the locations and courses of the more severe storms of the month are included in the following general summary.

PRESSURE.

The mean atmospheric pressure for the month was unusual in some respects. The Azores or North Atlantic HIGH, with a crest of 30.25 in., was practically normal in position, while the Icelandic LOW, with a minimum reading of 29.55 in. was considerably south of its usual location. The intensity of both these areas was greater than ordinary, and the steep gradient between them was responsible for the frequency of gales within the intermediate territory.

The most remarkable feature, was the unusually low pressure that prevailed in West Indies waters during the month, due to the comparatively large number of West Indies hurricanes that passed over that region. The point of average lowest pressure was located to the southward of Cuba, where the average pressure for the month was about 29.80 inches. The variations in pressure from day to day were not remarkably large, and the means for the three decades of the month differed somewhat less than usual, as shown by the following table that gives for a number of selected 5-degree squares the average pressure for each of the three decades, as well as the highest and lowest individual readings reported during the month within the respective squares:

Pressures over the North Atlantic during October, 1916, by 5-degree squares.

Position of 5-degree squares.		Decade means.			Extremes.			
					Highest.		Lowest.	
Latitude.	Longitude.	I	II	III*	Pressure.	Date.	Pressure.	Date.
°	°	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Oct.*	*Inches.*	*Oct.*
60–65 N	20–25 W	29.57	29.61	29.38	30.08	1	29.00	24
60–65 N	0– 5 W	29.57	29.60	29.54	30.11	1	28.89	31
60–65 N	5–10 E	29.62	29.62	29.79	30.02	1	28.90	15
55–60 N	35–40 W	29.59	29.71	29.56	30.00	1	29.32	30
55–60 N	15–20 W	29.56	29.73	29.28	30.10	1	28.70	24
55–60 N	0– 5 E	29.68	29.81	29.61	30.20	1	29.10	31
50–55 N	55–60 W	29.85	29.88	30.02	30.41	19	29.42	6
50–55 N	45–50 W	29.69	29.83	29.90	30.32	20	29.38	10
50–55 N	20–25 W	29.60	29.96	29.52	30.45	15	29.21	30
50–55 N	10–15 W	29.70	29.99	29.36	30.22	15	29.00	30
45–50 N	65–70 W	30.11	29.93	30.13	30.52	23	29.40	17
45–50 N	40–45 W	29.75	30.01	30.04	30.56	20	29.48	2
45–50 N	15–20 W	29.87	30.24	29.70	30.48	15	29.38	24
40–45 N	70–75 W	30.22	30.06	30.18	30.50	19, 23, 29	29.54	17
40–45 N	55–60 W	30.04	30.14	30.23	30.63	19	29.65	10
40–45 N	20–25 W	30.04	30.41	30.03	30.62	15	29.62	1
40–45 N	0– 5 W	30.20	30.25	29.94	30.41	11	29.80	24
35–40 N	65–70 W	30.13	30.14	30.10	30.40	5, 19	29.78	10, 31
35–40 N	30–35 W	30.07	30.36	30.27	30.50	17, 18	29.60	1
25–30 N	75–80 W	29.93	30.01	29.85	30.09	13	29.70	3
25–30 N	60–65 W	30.02	30.04	30.06	30.19	23	29.67	12
25–30 N	35–40 W	30.09	30.20	30.17	30.29	11	29.94	3
20–25 N	90–95 W	29.91	29.84	30.00	30.06	23	29.45	17
15–20 N	80–85 W	29.83	29.77	29.81	29.90	7, 23	29.30	14
15–20 N	25–30 W	29.96	30.04	29.98	30.10	14	29.90	2, 3

* Includes last 11 days of the month.

The mean and extreme values presented in the above table are based on the daily pressure values determined by interpolation of each square on the MS. daily synoptic charts of the North Atlantic compiled by the Marine Section of the Weather Bureau.

GALES.

The number of gales reported during the month varied considerably, as compared with the normal, over different parts of the ocean. Winds of gale force were comparatively frequent in the area between the 45th and 55th parallels and the 15th and 45th meridians, where they were reported on from 3 to 11 days, which was considerably above the normal. The number of days with gales in the Gulf of Mexico and West Indies waters was also above normal; while south of the 45th parallel and east of the 70th meridian the number of gales was less than usual.

From October 1 to 5 a well-developed LOW remained nearly stationary between the 48th and 58th parallels and the 20th and 40th meridians, its movements from day to day between these limits being slight and irregular. This disturbance attained its greatest intensity on the 2d and 3d, the lowest barometric reading being 29.10 inches on both of these dates. No heavy winds were reported near the center, although on the 3d vessels near latitude 38° N., longitude 52° W., encountered northerly gales of from 50 to 65 miles an hour.

On the 3d a LOW (*I* on Chart IX) was central near latitude 30° N., longitude 75° W. Vessels off the coast a short distance south of Hatteras reported northeasterly gales of from 40 to 55 miles an hour, although the storm area was limited. This disturbance moved slowly westward and on the 4th the center was near latitude 30°, longitude 79°, where it curved sharply toward the south, and on the 5th was about midway between Swan Island and the Isle of Pines. Light and moderate winds prevailed.

From the 6th to the 9th there were a number of depressions of varying intensities scattered over the ocean, but no specially heavy winds were reported.

Mr. R. H. Weightman, in a paper on hurricanes of 1916 (MONTHLY WEATHER REVIEW, December, 1916, 44:686–688), plotted and described two storm tracks that are here shown on Chart IX as *II* and *III*. LOW *II* was so far south that its position could not be located on Chart IX until October 10, when its center was about 150 miles northeast of San Juan, Porto Rico. One vessel near the center reported a southeasterly gale of 55 miles an hour, but no heavy winds were reported west of the 70th meridian. This disturbance moved slowly toward the north, developing into a severe hurricane. On the morning of the 11th, when its center was near latitude 24°, longitude 64°, the barometer reading was 28.91 inches, and one vessel in latitude 25° 18′ N., longitude 63° 13′ W., reported a minimum reading of 28.38 inches at 4 p. m. on October 11 with a southwest wind of over 90 miles an hour. This storm continued its northerly course with a comparatively uniform rate of translation, and on the 12th was central near latitude 28°, longitude 63°. Its intensity had apparently decreased slightly since the previous day although winds of gale force still prevailed in the northern quadrants, but no reports were received from the region between the 23d and 30th parallels and the 50th and 80th meridians.

On October 12 LOW *III*, of slight intensity and limited extent, surrounded the island of Jamaica; the lowest barometer reading was 29.70 inches, and the winds were light to moderate. On the 13th LOW *II* had moved to near latitude 34°, longitude 59°, and its pressure had risen to a lowest reading of 29.99 inches, although one vessel near the center reported a strong northerly gale, while three other observers in the same locality recorded moderate winds. On the same day the center of *III* was near latitude 16°, longitude 80°, conditions of wind and weather having changed but little since the 12th. There was also a severe disturbance in northern waters, as one vessel near latitude 49° N., longitude 40° W., recorded a barometric reading of 28.90 inches, with a southwesterly gale of 65 miles an hour. LOW *II* moved rapidly northward, and on the 14th was in the vicinity of Nova Scotia, where the minimum barometric reading was 29.50 inches, moderate gales prevailing in the southeast quadrants. LOW *III* continued its westerly movement, increasing in intensity, and on the 14th northeasterly gales of hurricane force raged over the region between Cuba and Central America. The northern disturbance (LOW *II*) traveled speedily toward the northeast, and on the 14th the center was near latitude 59° N., longitude 8° W., where the barometer was 28.80 inches. On the same date a HIGH, with a crest of 30.44 inches, existed over the Azores, and the steep gradient between the two areas was accompanied by unusually heavy westerly and northwesterly winds in the intermediate territory, velocities of from 40 to 65 miles an hour being reported. By October 15 LOW *II* had apparently moved to Labrador, although its exact location could not be determined for lack of observations.

LOW *III* continued its westward course, and on the 15th was near the northeast coast of Yucatan, Mexico; winds of hurricane force, accompanied by torrential rains, were still raging over a limited territory. On the 16th the center of the disturbance was over the northwest coast of Yucatan, the weather conditions having moderated since the previous day, although moderate gales were still reported. During the next 24 hours the northerly drift of this disturbance was slight, the wind velocities remaining practically constant, and the barometer having fallen slightly. The rate of translation then increased, and on the 18th the storm was central about 100 miles east of New Orleans, moderate gales still prevailing.

On Chart III (XLIV—127) Tracks of Centers of Low Areas for October, 1916, a LOW (*IV* on Chart IX) is shown on the morning of October 15 near Edmonton, Alberta. By the morning of the 17th this disturbance had moved to near Quebec, where the barometer reading was 29.36 inches, accompanied by moderate winds. The LOW continued its course toward the northeast, and on the 18th the center was near latitude 54°, longitude 46°; strong westerly and southwesterly winds of 40 to 65 miles occurred in the southeast quadrant. On the 19th the center was in the vicinity of latitude 57°, longitude 28°, with a barometer reading of 29.55 inches. On the same date a HIGH, with a crest of 30.68 inches, was central off the east coast of Nova Scotia, and the steep gradient caused strong northwest gales, attended by hail, over a portion of the region between the two areas, where the barometer readings ranged from 29.97 inches to 30.11 inches. From the 20th to the 23d the path of LOW *IV* eastward was irregular, as shown on Chart IX, and no specially heavy winds were reported.

On the 23d a fifth LOW, with a minimum reading of 29.20 inches, was central near latitude 58°, longitude 27°, strong northwesterly gales prevailing over a limited territory in the southwest quadrant. On the 24th this LOW was near latitude 58°, longitude 27°, and had increased in intensity since the previous day, as the barometer now read 28.70 inches. At the same time a HIGH had its crest near St. Johns, N. F., where the barometer reading was 30.54 inches. Violent northwesterly gales, accompanied by hail and rain, swept a large area between the centers. The LOW drifted slowly toward the east, and on the 25th was near latitude 56° N., longitude 10° W., with practically the same intensity, and northwesterly gales attended by hail still continued east of the 35th meridian over the steamer lanes. During the next 24 hours this disturbance moved about 200 miles toward the north, decreasing slightly in intensity, although on the 26th moderate to strong gales still prevailed near its center and between the 30th and 45th meridians. On the 27th it covered the southern part of the Irish Sea, had decreased in extent, and increased slightly in intensity since the previous day. Vessels off the south coast of Ireland encountered northerly gales of from 50 to 65 miles an hour, while over the remainder of the ocean moderate winds were the rule, the highest velocity recorded being 40 miles an hour within a limited territory between the 35th and 45th meridians. From the 28th to the 30th the LOW remained nearly stationary in the vicinity of Great Britain. On the 29th reports were received from vessels in widely scattered positions along the steamer routes, denoting winds of gale force, while between the 30th and 40th meridians only light to moderate winds were encountered. The conditions on the 30th and 31st did not differ much from those of the 29th, although the storm area had increased somewhat in extent.

From the 23d to the 30th a LOW of slight intensity occupied the western division of the Caribbean Sea between Cuba and Central America, remaining nearly stationary during that period. As a rule it was not attended by winds of high velocities, although one vessel reported a southeasterly gale of about 50 miles an hour on October 25 in the vicinity of latitude 23° longitude 75° W.

TEMPERATURE.

The temperature of the air during October, 1916, was somewhat below the normal over a large portion of the ocean, but it was slightly above in the waters adjacent to the European coast, and over the greater part of the region between the 30th and 40th parallels in the vicinity of the American coast. North of the 40th parallel the positive departures ranged from 2 to 5, while along the coast south of Georgia and in the Gulf of Mexico they were either zero or slightly negative.

The seasonal fall of temperature during the month was quite marked, especially in the higher latitudes, the average for the last decade being considerably below that of the first.

The following table gives the temperature departures for the month at a number of Canadian and United States Weather Bureau stations on the Atlantic and Gulf coasts.

	°F.		°F.
St. John's, N. F.	+1.1	Norfolk, Va.	+1.7
Sydney, C. B. I.	+3.7	Hatteras, N. C.	+0.5
Halifax, N. S.	+2.7	Charleston, S. C.	+0.3
Eastport, Me.	+1.8	Key West, Fla.	+0.6
Portland, Me.	+1.3	Tampa, Fla.	+2.4
Boston, Mass.	+3.2	Mobile, Ala.	+1.7
Nantucket, Mass.	+0.1	New Orleans, La.	+2.1
Block Island, R. I.	−0.2	Galveston, Tex.	+0.1
New York, N. Y.	+1.6	Corpus Christi, Tex.	+0.8

FOG.

The amount of fog reported during the month was less than usual over all parts of the North Atlantic; this was specially noticeable off the Banks of Newfoundland where the normal percentage ranges from 30 to 35, while during October, 1916, it was observed on two days only, a percentage of 6. For the month under discussion the greatest amount of fog occurred in the Gulf of St. Lawrence and off the Nantucket Shoals; it was observed on four days in both localities, a percentage of 13, while the normal percentage is from 10 to 20. There was practically no fog along the steamer lanes east of the 40th meridian.

HAIL.

The most frequent occurrence of hail was in the 5-degree square between latitudes 50°–55° and longitudes 30°–35°, where it was reported on the 24th, 25th, and 28th. In no other square was it observed on more than two days, and none was reported west of the 50th meridian.

Winds of 50 mis./hr. (22.4 m./sec.), or over, during October, 1917.

Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.
		Mis./hr.				*Mis./hr.*	
Atlanta, Ga.	30	52	w.	Louisville, Ky.	26	52	sw.
Block Island, R. I.	24	70	e.	Do.	29	50	s.
Do.	30	60	w.	Nantucket, Mass.	21	54	e.
Buffalo, N. Y.	3	50	sw.	Do.	30	68	sw.
Do.	5	50	w.	New York, N. Y.	12	56	se.
Do.	12	72	sw.	Do.	24	51	n.
Do.	13	62	sw.	Do.	27	54	sw.
Do.	14	54	sw.	Do.	30	62	s.
Do.	26	56	sw.	Norfolk, Va.	30	55	nw.
Do.	27	58	sw.	North Head, Wash.	27	56	nw.
Do.	28	58	sw.	Pierre, S. Dak.	22	52	nw.
Do.	30	76	sw.	Providence, R. I.	30	55	w.
Burlington, Vt.	19	50	s.	Richmond, Va.	5	52	nw.
Cheyenne, Wyo.	17	50	w.	Salt Lake City, Utah.	27	52	n.
Do.	19	54	w.	Sandy Hook, N. J.	24	68	e.
Do.	21	51	w.	Do.	27	55	s.
Do.	27	55	w.	Do.	30	64	s.
Devils Lake, N. Dak.	22	50	n.	Sioux City, Iowa.	11	55	nw.
Duluth, Minn.	11	54	nw.	Do.	18	52	nw.
Eastport, Me.	24	56	e.	Do.	22	57	nw.
Do.	25	54	e.	Tatoosh Island, Wash.	1	54	s.
Do.	30	56	se.	Do.	2	52	s.
Hatteras, N. C.	30	56	s.				